Work Management Plan for Title I, II, and III Project Reviews in Plant Engineering

prepared by members of the PE **Process Action Team** for Improving Interactions Between PE Maintenance & Operations and Engineering/Construction

Revision 1
January 1, 2000

Issued:

Bernard Mattimore, Plant Engineering Acting Department Head

Contents

1. Purpose

This plan defines the manner in which project reviews are conducted in Plant Engineering. "Project reviews" are here defined as reviews, planned or otherwise, that take place throughout the course of a project to assess its status and progress. Project reviews include kickoff meetings, formal design reviews, and ad-hoc reviews that may be conducted during title III to review submittals or proposed change orders.

In addition, this plan defines the representation on project teams and the responsibilities of each representative as they relate to project reviews. It defines the areas within a project where the accountability of each team member must be ensured: comment resolution, project acceptance, and document sign-off.

Building commissioning is also included under project reviews. In general, the principles of building commissioning are implicit in this plan and apply to all work performed by Plant Engineering. However, for large projects a formal building commissioning process may be desirable and this process is defined in part 6 of this plan.

2. Responsibility: Project Team

This section defines the respective responsibilities of the project team members. In general, the project team is responsible for ensuring that the project meets the client requirements of fitness of purpose, usability, and cost. The team must additionally ensure that the project conforms to applicable federal, state, and local codes and regulations, as well as the documents referenced in appendix A of this plan, in accordance with the provisions of PE Management Policy Memorandum (MPM) 26, *Use of Standards at LLNL*. The team must ensure that the project conforms to applicable LLNL infrastructure requirements of life cycle cost, maintainability, value engineering, and other design constraints defined in LLNL facilities standards. During construction, the team must ensure that submittals and change orders conform to the project requirements, and that responses to requests for information (RFIs) also reflect the project requirements.

Project teams members that have specific responsibilities for formal building commissioning are identified with an asterisk [*].

The project team shall normally consist of at least one of each of the functional members listed in this section. Each member of the project team shall be fully authorized to make decisions on behalf of their organization or functional area.

Where conflict occurs between client requirements and external requirements such that compromise is not possible, it is the responsibility of the project team to refer the conflict to Plant Engineering line management for resolution.

2.1 Client

The client is responsible for successfully completing a project on behalf of their program. The client is accountable to their program.

2.2 Project Manager *

The project manager (PM) is responsible for achieving the objectives of a specific project. The PM is accountable both to the client and to Plant Engineering line management. The project manager is also responsible for ensuring that project reviews are conducted in accordance with sections 4.2 and 4.3, and that all

comments are appropriately resolved. The project manager will ensure that team members observe the provisions of MPM 26 in their conformance to regulations, codes and standards.

Building Commissioning: The project manager is responsible for determining whether or not formal commissioning is required using a graded approach, and for assigning a commissioning agent.

2.3 Construction Manager *

The construction manager (CM) is responsible for ensuring that all project construction is carried out in accordance with the requirements of the drawings and specifications. The CM is accountable to the project manager.

Building Commissioning: The construction manager is responsible for ensuring that commissioning testing is performed in accordance with the commissioning schedule and the commissioning test plan.

2.4 Design Manager *

The design manager (DM) is responsible for ensuring that all design is carried out in accordance with the project's objective. The DM is accountable to the project manager.

Building Commissioning: The design manager is responsible for preparing the basis of design and design intent documents, and ensuring that they accurately reflect the current state of the project.

2.5 Design Engineer(s)

Design engineers on a team are responsible for specific design-related tasks during the course of a project.

2.6 Specification Editor

The specification editor is responsible for ensuring that specifications and design criteria meet the technical requirements of the design team while conforming to the business requirements of the Procurement department and the contractual requirements of the Legal department.

2.7 Estimator

The estimator is responsible for all estimates for designs produced by the team. See Plant Engineering MPM 19.

2.8 Inspector

The inspector is responsible for ensuring that all work performed by construction subcontractors is in accordance with the drawings, specifications, and (where applicable) codes. The inspector is also responsible for daily construction coordination on PO contracts. The inspector is accountable to the construction manager.

2.9 M&O Representative *

The M&O design team representative is responsible for ensuring that M&O design issues are addressed by the design team. These issues may include (but are not necessarily limited to) utility clearances and rights-of-way, maintainability, safety of maintenance personnel, and energy management.

Building Commissioning: The M&O representative functions as the utility and custodian of installed real property, building systems, and facility. As directed by the commissioning agent and construction manager, the M&O representative may be required to ensure that commissioning testing is performed in accordance with the commissioning portions of the specifications.

2.10 Hazards Control Representative

The Hazards Control representative is responsible for ensuring that the design team addresses all pertinent health and safety issues that may result from the use of hazardous materials on the job site or in the facility. The Hazards Control representative also reviews construction safety plans.

2.11 Security Representative

The LLNL security representative is responsible for ensuring that the design team addresses all pertinent security issues in their design.

2.12 Environmental Protection Department (EPD) Representative

The EPD representative is responsible for ensuring that the design team addresses all issues relating to environmental protection and regulatory permitting requirements. The EPD representative also reviews construction safety plans (where such plans relate to EPD issues) and storm water pollution prevention plans.

2.13 Space and Site Planning (SSP) Representative

The Space and Site Planning representative is responsible for ensuring that LLNL land and facility space used by the project are apportioned effectively. See Plant Engineering MPM 9.

2.14 Building Commissioning Agent *

The building commissioning agent is responsible for ensuring that building commissioning is carried out for a project. See part 6 of this plan.

3. Responsibility: Line Management

This section defines the respective responsibilities of Plant Engineering line management in project reviews. In general, line management is responsible for ensuring that design teams are adequately staffed. Line management must additionally ensure that conflicts between the design team, the client, and other project team representatives are adequately resolved.

3.1 Principal Engineer

Principal engineers are responsible for the technical content of design standards and the resolution of code related issues or conflicts.

3.2 Group Leader/Supervisor

Group leaders are responsible for ensuring that there is sufficient, qualified staff within a particular design discipline to accomplish project work.

3.3 Management (Deputy Division Leaders, Division Leaders, Department Heads, the Deputy Associate Director)

Plant Engineering management is responsible for providing technical and administrative guidance to project teams. Management is also responsible for resolving conflicts that a project team is unable to resolve.

4. Work Support Activities

Work support activities are those planned activities that ensure that any project conducted in Plant Engineering receives the proper review, from the genesis of the project through final acceptance.

4.1 Project Kickoff

Prior to title I, a project kickoff checklist shall be developed and made a formal part of the project file. A *Project Kickoff Guide and Checklist* is provided as an attachment to this work management plan. The checklist may be used as is, following the graded approach outlined in the *Project Kickoff Guide*. However, you may develop your own checklist if you choose; at a minimum, your checklist must define the project's functional requirements and scope of work, the project team personnel, and the content of subsequent design reviews.

4.2 Project Reviews, Title I and II

Project reviews shall be held at least once during the course of title I and II. In general, these reviews shall take place at the times outlined during scope development and listed in the project kickoff checklist. Each project review shall consist of the following (though not necessarily in the order shown):

4.2.1 **Project Package Distribution:** Each project package shall consist of a project review cover page, the various project documents, and a comment resolution sheet. The project manager or designee shall prepare the project review cover page and distribute the review package to the project team members.

4.2.2 **Project Package Review:** Review of the project package shall take place within the period specified in the project review cover page. Reviewers shall note all comments in the appropriate places on the comment resolution sheet. Comment resolution sheets shall be returned to the project manager or designee within the period specified on the project review cover page. The length of review periods should be determined by team consensus.

4.2.3 **Project Review Meeting:** Comments generated during the project package review are addressed at the project review meeting. All comments should be resolved; where conflict remains after every attempt by the team at resolution, the conflict shall be referred to the appropriate level of line management for resolution.

All resolutions to comments shall be recorded on the appropriate comment resolution sheet by the project manager or designee and a copy sent to the commenter.

4.3 Project Reviews, Title III

There are no formal project reviews during title III for in-house projects. For design build projects or projects where design is prepared by A/E firms, title III reviews shall be conducted in accordance with the requirements given in the specification or design criteria, respectively. In general, the construction manager shall review all title III work as it progresses. The construction manager is responsible for initiating and coordinating reviews of submittals, requests for information, and change orders. The construction manager shall review the project kickoff checklist to ensure that appropriate project team members are included in the review.

4.3.1 **Submittals** Submittal reviews shall be coordinated by the construction manager in accordance with the requirements of the construction schedule. All submittals shall be reviewed and issues resolved within the time limits set by the construction manager. Where conflicts exist within the project team over the review of submittals that cannot be resolved within the allotted time, the conflict shall be referred to the appropriate level of line management for resolution.

4.3.2 **Requests for Information (RFIs)** RFIs initiated by the subcontractor shall be coordinated by the construction manager in accordance with the requirements of the construction schedule. All RFIs shall be resolved within the time limits set by the construction manager. Where conflicts exist within the project team over the resolution of RFIs that continue beyond the allotted time, the conflict shall be referred to the appropriate level of line management for resolution.

4.3.3 **Change Orders** Change orders shall be initiated by the construction manager in accordance with the requirements of the construction schedule. All change orders shall be reviewed and issues resolved within the time limits set by the construction manager. Where conflicts exist within the project team over appropriate action on changes that cannot be resolved within the allotted time, the conflict shall be referred to the appropriate level of line management for resolution.

4.4 Document Control

Document control consists of the planned actions (outlined below) that ensure that individual design documents are properly reviewed and meet the intent of design.

4.4.1 **Drawings** Drawings are considered preliminary until they are released for construction. During the preliminary stage, each revision to a drawing shall carry a revision number. When a drawing is released for construction, it will become revision 0 (zero) and the "Release for Construction" signature block will be signed. "Released for Construction" signifies that the drawings have been reviewed by the project team, correctly reflect the project intent, and are constructable.

4.4.2 **Specifications** Specifications are considered preliminary until they are stamped "construction copy." The "construction copy" stamp signifies:

1. The specification has been reviewed by the project team, correctly reflects the project intent, and is constructable.

2. The specification has been prepared by a specifications engineer and has been reviewed for clarity, consistency, and correct contract language.

4.4.3 **Procurement Specifications** Procurement specifications are considered preliminary until they are signed off. See "Signature Rules," below.

4.4.4 **Construction Change Orders** Change orders are considered preliminary until they are signed off. See "Signature Rules," below.

4.5 Signature Rules

4.5.1 **Drawings** Each drawing in the project package shall be signed off when it is ready to be released for construction, in accordance with MPM 28. The necessary signatures are those detailed in MPM 28. The signatures signify:

1. Each drawing has been reviewed by the project team, correctly reflects the project intent, and is constructable.

2. Each drawing has been reviewed by a higher technical authority within the designer's line management and reflects good engineering practice and current LLNL facilities standards.

3. Each drawing has been reviewed by Plant Engineering line management and reflects the administrative sanction of Plant Engineering.

4.5.2 **Specifications** Specifications shall be signed off when they are ready to be released for construction. The necessary signatures are those detailed in the General Provisions, sections 01010 or 01011, paragraph 1.09, *Engineering Certification*. The signatures signify that the specification has been reviewed by a licensed professional engineer for the discipline(s) indicated in the signature block. *Note that only the design disciplines pertinent to the project need sign here.*

4.5.3 **Procurement Specifications** Procurement specifications shall be signed off when they are ready to be released for a request for quotation. The necessary signatures are those of the designer who authored the specification, the designer's technical supervisor, the project manager, and the specification editor who reviewed and edited the specification. The signatures signify:

1. The specification has been reviewed by the design team, correctly reflects the design intent, and is purchasable (or constructable).

2. The specification has been prepared by a specifications engineer and has been reviewed for clarity, consistency, and correct contract language.

3. The specification has been reviewed by a principal engineer (or appropriate higher technical authority within the author's line management) and reflects good engineering practice and current LLNL facilities standards.

4.5.4 **Design Criteria/Augmented Scopes** Design criteria and augmented scopes shall be signed off in accordance with MPM 28 when they are ready to be released for bid or (in the case of the scope) presented to the client. The signatures signify:

1. The criteria/scope has been reviewed by the project team and correctly reflects the project intent.

2. The criteria/scope has been prepared by a specifications engineer and has been reviewed for clarity, consistency, and correct contract language.

3. The criteria/scope has been reviewed by higher technical authorities within the projects team's line management and reflects good engineering practice and current LLNL facilities standards.

4.5.5 **Conceptual Design Reports (CDRs)** CDRs shall be signed off when they are ready to be proposed to the relevant funding source. The signatures shall consist of the project team that prepared the CDR. The signatures signify that the CDR has been reviewed by the project team and correctly reflects the project intent, that it has the administrative sanction of both LLNL and the DOE.

4.5.6 **Construction Change Orders** Change orders shall be initiated when the construction manager and the project team agree that the proposed change to the project be carried out in construction. The signatures shall consist of the construction manager, the project manager, the subcontract administrator, and (when necessary) the authorized account signature. The signatures signify that:

1. The proposed change has been reviewed by the construction manager and other relevant members of the project team, and correctly conforms to the project intent.

2. The subcontract administrator authorizes the proposed change order on behalf of Procurement to modify the contract with the subcontractor.

4.6 Record Control

Record control consists of the planned actions (outlined below) that ensure that individual project review records are properly reviewed and filed. See appendix B for retention rules.

4.6.1 **Authorized Work Request** The authorized work request for the project, in the form of a signed Form 1, shop job order, or a whiz tag, shall be a primary project record and shall be retained in the project file.

4.6.2 **Project Kickoff Checklist** The project kickoff checklist, when completed by the project manager, shall be a primary project record and shall be retained in the project file.

4.6.3 **Project Review Cover Page** Each project review package shall have a project review cover page. Each of these cover pages shall be a primary project record and shall be retained in the project file.

4.6.4 **Comment Resolution Sheet** Each comment resolution sheet, when completed by the project manager, shall be a primary project record and shall be retained in the project file.

4.6.5 **Requests for Information (RFIs)** Each RFI, when completed by the construction manager, shall be a primary project record and shall be retained in the project file.

4.6.6 **Defects and Omissions Report (Punchlist)** Each punchlist, when finalized by the inspector, shall be a primary project record and shall be retained in the project file.

5. Work Controls

5.1 Project Authorization

All work entering Plant Engineering must be authorized by a completed Form 1, shop job order, or whiz tag.

5.2 Problem Correction

Any problems that arise during the course of the project should be addressed by the project team in the project review process. See section 4.2, above.

5.3 Change Control

5.3.1 **Title I and II (Design)** Changes that occur during title 1 and 2 design shall be formally approved with a modified task plan. Changes covered by the modified task plan would consist of any changes resulting in a change to the original budgeted scope.

5.3.2 **Title III (Construction)** Changes that occur during title III shall be formally approved in the change order process. See section 4.3.3, above.

5.4 Acceptance Control

5.4.1 **Title I and II** Title I and II work is not considered to be formally accepted until it is signed off. See section 4.4, above. Prior to sign off, acceptance within the project team is obtained during project reviews. See section 4.2, above.

5.4.2 **Title III** Acceptance of title III work is contingent on the successful resolution of items noted on the inspector's final punchlists. (See section 4.4.6, above).

6. Building Commissioning

6.1 General

When a project team determines that formal building commissioning is required for a project, a commissioning agent shall be selected and the requirements of this part observed.

6.2 Commissioning Agent

The Building commissioning agent is responsible for carrying out the overall commissioning process. The agent may an existing project team member such as the design manager. However the project may elect to subcontract the commissioning duties, in which case the agent may be a consultant or a commissioning firm.

6.3 Commissioning Documentation

Commissioning documentation consists of the documents specified in parts 4 and 5 of this plan, plus the documents listed below. All commissioning documents are primary project records and shall be retained in the project file.

6.3.1 **Commissioning Plan** The commissioning plan describes the commissioning process for the project, and includes the following:

1. Commissioning scope
2. Commissioning schedule
3. List of commissioning documentation
4. Testing scope
5. Monitoring plan

6.3.2 **Commissioning Test Plan** The test plan describes all the commissioning tests that will performed over the course of the project along with their desired outcomes.

6.3.3 **Basis of Design** The basis of design is a document describing a project's functional criteria that will be used as the basis for design.

6.3.4 **Design Intent** The design intent document describes the commissioned portions of project in terms of how they are to perform when the project is completed. Each item in the design intent document should be described in a manner that can be verified by testing.

Appendix A: QA Documents Governing Projects

DOE/UC Contract 48 Work Smart Standards Set
LLNL ES&H Manual
PE Management Policy Memoranda (MPM):
- MPM 9, Space and Site Planning
- MPM 19, Estimates
- MPM 26, Use of Standards at LLNL
- MPM 28, Signatures (on Drawings and Specifications)

PE Engineering and Construction Department QA Plan
Construction Managers Manual
Inspectors Manual
LLNL Facilities Standards
General industry Standards

Appendix B: Work Management Records Required by This Plan

File No.	QA Record	Responsibility	Retention
Work Request Authorization Control Documents			
PRR-01-000-R	Work Request (Form 1, etc.)	Project Manager	project close
Acceptance Control Documents			
PRR-01-000-C	Scope/kickoff checklist	Project Manager	project close
PRR-02-000-C	Design package cover sheet	Project Manager	project close
PRR-03-000-C	Comment resolution sheets	Project Manager	project close
PRR-04-000-C	Requests for Information (RFIs)	Project Manager	project close
PRR-05-000-C	Inspector punchlists	Project Manager	project close
Administrative and Audit Records			
PRR-01-000-A	Management Review Records	E&C Department head	up to 7 years
PRR-02-000-A	QA audit records	E&C Department head	up to 7 years
Building Commissioning Records			
PRR-01-000-B	Commissioning Plan	Project Manager	project close
PRR-02-000-B	Commissioning Test Plan	Project Manager	project close
PRR-03-000-B	Basis of Design	Project Manager	project close
PRR-04-000-B	Design Intent	Project Manager	project close